Cahoy Dec. Ex. 8

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1   UNITED STATES DISTRICT COURT

2   FOR THE NORTHERN DISTRICT OF CALIFORNIA

3   SAN FRANCISCO DIVISION

4   ---o0o---

5   IN RE: DA VINCI SURGICAL   Lead Case No.

     ROBOT ANTITRUST LITIGATION,   3:21-cv-03825-VC

6   /

7   SURGICAL INSTRUMENT SERVICE

     COMPANY, INC.,

8

         Plaintiff,

9   vs.   No. 3:31-cv-03496-VC

10   INTUITIVE SURGICAL, INC.,

11   Defendant.

         _____/

12

13

14

15   (HIGHLY CONFIDENTIAL - ATTORNEY'S EYES ONLY)

16   VIDEOTAPED VIRTUAL VIDEOCONFERENCE

17   DEPOSITION OF SHARATHCHANDRA "SHARK" SOMAYAJI

18   November 4, 2022

19

20

21

22

23   Reported by: Kimberly L. Avery, CSR No. 5074

24   Job No. 5563382

25   Pages: 1 - 150

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1   "Where do I find it?"

2   Do you see that?

3   A.   I do.

4   Q.   Is that the -- the file path for the data

5   that is stored onto a particular RFID chip of an   12:53

6   Xi instrument?

7   MS. CAHOY: Objection to form.

8   THE WITNESS: Can you repeat the question

9   again.

10   BY MR. VAN HOVEN: 12:53

11   Q.   Sure.   Do you see that there's a file path

12   next to "Where do I find it?"

13   A.   That's correct.

14   Q.   What is that file path referring to?

15   A.   That is the location where you can find   12:54

16   the RFID data for that particular instrument.

17   Q.   And is that the data that is, then, stored

18   on the tag during the manufacturing process?

19   A.   Not completely.

20   Q.   What do you mean?   12:54

21   A.   That is one part of the data that goes

22   into the RFID tag.

23   Q.   What part is that?

24   A.   So, the data that's in that particular

25   location, it has the instrument drive parameters   12:54

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1   that are needed to move the instrument around.

2   Q.   What are the other parts of the data that

3   are put onto the RFID tag?

4   A.   Can you clarify for which instrument?

5   Q.   Sure. For Xi instruments generally, there 12:55

6   is additional data other than the drive

7   parameters, correct?

8   A.   You need to clarify more than Xi 8 -- Xi

9   instrument. You have to give me specifics.

10   There's too many varieties of Xi instruments.   12:55

11   Q.   Sure. Let's talk about Xi 8 millimeter;

12   can you do that?

13   A.   For Xi 8 millimeter instruments, this is

14   the drive -- this is the drive parameter portion.

15   Other pieces of information that go on the 12:55

16   RFID tag would be calibration, use counts, those

17   are the two other big pieces of information that

18   goes in.

19   Q.   One you said was calibration; is that

20   right?   12:56

21   A.   That is correct.

22   Q.   Another one you said use counts?

23   A.   That is correct.

24   Q.   What are you referring to by "use counts"?

25   A.   Use count, the way I understand it, is the 12:56

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1   number of procedures this Xi instrument can work

2   on.

3   Q.   And that's something that is programmed

4   into a memory location of the RFID tag?

5   A.   That is correct.   12:56

6   Q.   Do you know if that is read only memory?

7   A.   That -- I do not know -- let me clarify.

8   No, it's not read only memory.

9   Q.   What kind of memory is it?

10   A.   One-time programable memory.   12:57

11   Q.   What is one-time programmable memory?

12   A.   You can program it only once.

13   Q.   And you can't change it?

14   MS. CAHOY: Objection to form.

15   THE WITNESS: So one-time programmable   12:57

16   memory, the way it works is it's a one-directional

17   stream.   I can decrement, but I cannot increase.

18   BY MR. VAN HOVEN:

19   Q.   Got it.

20   So you can't change it, but you can only   12:57

21   decrement a number?

22   A.   That is correct.

23   Q.   I'd like to go to the next slide, which is

24   slide 5.

25   A.   Josh, you did go through slide 3, but   12:57

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 1     again, I'm very clear on slide 3, if you look at

 2     it.  I am not the subject matter expert.  This is

 3     me giving a presentation, from my understanding,

 4     to a bunch of folks in quality organization.

 5             So it is a low-level manufacturing         12:58

 6     engineer giving presentation to another

 7     organization.

 8         Q.  You are a manager of manufacturing

 9     engineering, aren't you?

10         A.  I am.                                      12:58

11         Q.  And you knew at one time what programable

12     memory is, don't you?

13         A.  That is correct, yes.

14             So you wanted me to go to slide 7?

15         Q.  Slide 5.                                   12:58

16         A.  5.  Okay.

17         Q.  Do you see there's a reference there to

18     "RFID data (TUID)?"

19         A.  That's correct.

20         Q.  And in your presentation, it says, "TUID   12:58

21     equals Tool User ID."

22             Do you see that?

23         A.  That's correct.

24         Q.  What is a Tool User ID?

25         A.  A Tool User -- a Tool -- a TUID is a very  12:59
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1   specific number for a given instrument. So if you

2   go to the prior slide 4, there is a part number

3   there, 470001-07. So that ties into a very

4   specific TUID in the RFID chip.

5   Q.   And so a TUID is a value that's programmed   12:59

6   into the RFID chip; is that right?

7   A.   That's correct.

8   Q.   For every instrument?

9   A.   Correct.

10   Q.   Is it a unique number for every   12:59

11   instrument?

12   MS. CAHOY: Objection to form.

13   THE WITNESS: TUID is not unique.

14   BY MR. VAN HOVEN:

15   Q.   Is it -- does a TUID reference an   12:59

16   instrument type?

17   A.   That is correct.

18   Q.   You state that "the system does not care

19   about the part number or the version/revision of

20   an instrument."   13:00

21   Do you see that?

22   A.   That is correct.

23   Q.   What are you referring to there?

24   A.   So I have to explain to you the inner

25   workings of the robot. So when the -- when the   13:00

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1   robot reads the RFID tag -- so it is looking for

2   the TUID, that's the ID that it uses to generate

3   the drive parameters for the instrument.

4   So the part number version, what I'm

5   referring there, look at slide 4, 470001-07, the   13:00

6   system doesn't read that number specifically, but

7   it reads the TUID.

8   Q. And so then, based on the TUID, the robot

9   knows how to operate the instrument?

10   MS. CAHOY: Objection to form.   13:00

11   THE WITNESS: Not entirely.

12   BY MR. VAN HOVEN:

13   Q. But it uses a TUID to get parameters that

14   it uses to operate the instrument?

15   A. That is correct.   13:01

16   Q. Is the -- does the RFID chip have a power

17   source within the instrument?

18   A. It does not.

19   Q. Is it provided with a -- a power via an

20   antenna on the RFID chip?   13:01

21   A. That is correct.

22   Q. And that -- that power is in turn provided

23   by a -- I guess an antenna on the robot?

24   A. That is correct.

25   Q. And that -- and that power is then --   13:02

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1   while the antenna of the chip is being I guess

2   powered up, that's when the RFID tag can provide

3   information to the robot?

4   MS. CAHOY: Objection to form.

5   THE WITNESS: That is correct.   13:02

6   BY MR. VAN HOVEN:

7   Q. Does the RFID tag connect electrically to

8   any of the components of the instrument?

9   MS. CAHOY: Objection to form.

10   THE WITNESS: No, it does not.   13:02

11   BY MR. VAN HOVEN:

12   Q. Does the RFID tag directly control any of

13   the components of the instrument?

14   A. Can you -- again, you have to clarify the

15   question. I am a controls geek, so you have to   13:02

16   tell me what "controls" means.

17   Q. Sure. So we've established that the RFID

18   tag does not electrically connect to any other

19   components of the instrument, right?

20   A. That is correct.   13:03

21   Q. And maybe we'll get to settle on

22   terminology here.

23   There are various drive components in the

24   instrument such as yaw, pitch and roll generally?

25   A. That is correct.   13:03

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1   Q.   And would it be fair if I refer to them

2   as, say, a yaw drive system or a roll drive

3   system?

4   A.   Yes. Yes, you could say that.

5   Q.   And so the RFID tag does not directly   13:03

6   control the yaw drive system of an Xi instrument,

7   does it?

8   MS. CAHOY: Objection to form.

9   THE WITNESS: The question is unclear.

10   BY MR. VAN HOVEN: 13:04

11   Q.   What's unclear about it?

12   A.   The RFID tag is a passive tag. So it has

13   no power. So realistically, it is not doing

14   anything other than talking to the robot, so...

15   Q.   Right. So it's not -- it can't do   13:04

16   anything to directly control the yaw drive system

17   of the Xi instrument, right?

18   MS. CAHOY: Objection to form.

19   THE WITNESS: That is not entirely true.

20   BY MR. VAN HOVEN: 13:04

21   Q.   Why is that?

22   A.   The RFID tag has calibration information.

23   So that calibration information is needed for the

24   robot to perform the movements.

25   Q.   So the RFID chip wakes up, right?   13:04

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 1          A.   Correct.
 2          Q.   It provides that information to the robot?
 3          A.   That's correct.
 4          Q.   And the robot controls the instrument,
 5     correct?                                          13:04
 6          A.   Once the communication is complete, yes.
 7          Q.   And the RFID does not actually cause any
 8     movement of any of the drive systems of the
 9     instrument, Xi instrument, correct?
10               MS. CAHOY:  Objection to form.          13:05
11               THE WITNESS:  That is inaccurate.
12     BY MR. VAN HOVEN:
13          Q.   It's not electrically connected to any of
14     the drive systems, correct?
15          A.   I agree.                                13:05
16          Q.   It doesn't provide any signals to any of
17     the drive systems, does it?
18               MS. CAHOY:  Objection to form.
19               THE WITNESS:  That is wrong, because it
20     talks to the system.                             13:05
21     BY MR. VAN HOVEN:
22          Q.   It's a robot, right?
23          A.   It's a robot, correct.
24          Q.   And the robot turns motors?
25          A.   That is correct.                        13:05
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1   Q.   And the motors turn a disc?

2   A.   That is correct.

3   Q.   And the disc actuates a drive system?

4   A.   That is correct.

5   Q.   And that's what you are referring to when   13:05

6   you are saying the RFID chip is controlling the

7   operation of the drive system, that process?

8   MS. CAHOY: Objection to form.

9   THE WITNESS: So I think you need to

10   understand how the robot and the RFID chip work.   13:06

11   The RFID chip, it provides the information

12   for the robot to drive in a specific manner.

13   BY MR. VAN HOVEN:

14   Q.   Yeah.   It provides numbers such as

15   calibration values, right?   13:06

16   A.   That is correct.

17   Q.   Anything else that the RFID chip provides

18   to control -- that the robot then uses to control

19   the driving of the instrument?

20   A.   Not that -- not that I'm aware of.   13:06

21   Q.   I'm going to load Tab 19, which will be

22   Exhibit 211.   I'll represent that this is -- the

23   first page is labeled with Bates No.

24   Intuitive-00990665.

25   (Plaintiff's Exhibit No. 211 Marked for   13:07

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 1      at the time.

 2             Q.   And -- and who is Gabe Loring?

 3             A.   Gabe Loring is an engineer in the

 4      equipment team.

 5             Q.   And it appears that you got some          14:25

 6      information that led you to conclude that

 7      bypassing lives applies to Si only.

 8                  Do you see that?

 9             A.   That is correct.

10             Q.   And then it states, "Xi is impossible     14:25

11      according to them."

12                  Do you see that?

13             A.   That is correct.

14             Q.   What did you mean by "Xi is impossible

15      according to them"?                                   14:25

16             A.   I am trying to imply that changing the

17      lives of Xi instruments is impossible.

18             Q.   Does -- do Si instruments have an RFID

19      tag?

20             A.   No, they do not.                          14:25

21             Q.   Do they have a chip that includes a use

22      counter?

23             A.   Yes, they do.

24             Q.   Is the chip of the Si instrument that

25      includes the use counter different than the chip     14:26
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1   of an Xi instrument that includes a use counter?

2   A.   That's correct.

3   Q.   What are those differences?

4   A.   We're getting into more nerding --

5   nerding.   14:26

6   So, the Si instrument has something called

7   a Dallas chip, Dallas one-wire chip -- sorry, Kim,

8   I'll be slow -- have a Dallas one-wire chip. And

9   they have four mechanical pins called pogo pins.

10   These are pins that move in and out, that make the   14:26

11   connection to the robot. They have a physical

12   connection. They don't have power source. They

13   need to talk to the robot to deliver power, and

14   then they need to communicate to the robot through

15   the physical mechanical pogo pins.   14:27

16   In case of --

17   THE REPORTER: Are you saying pogo pins?

18   THE WITNESS: Pogo, P-O-G-O, pins.

19   In case of Xi instruments, we have an RFID

20   chip which does not have any electrical or   14:27

21   mechanical connection other than it is talking

22   through RF energy to the robot.

23   BY MR. VAN HOVEN:

24   Q.   Got it.

25   And is it your understanding that there's 14:27

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1   different encryption used on the Si Dallas chip

2   versus the Xi RFID chip?

3   A.   That is correct.

4   Q.   Is that the reason why at this time you

5   believe that Xi is impossible?   14:27

6   A.   That is correct.

7   Q.   Talk for a second about the data that's

8   stored on the Xi RFID chip.

9   A.   Uh-huh.

10   Q.   You talked a little bit about calibration 14:28

11   values.

12   A.   That's correct.

13   Q.   Remember that?

14   A.   Yup, I did.

15   Q.   And those are values that are passed from 14:28

16   the chip when it's energized by the robot?

17   A.   Yes.

18   Q.   What would happen if those calibration

19   values were zeroed out?

20   A.   If those calibration values were zeroed   14:29

21   out, the robot would not know where the zero

22   position of the instruments are, like for the

23   tips, and you would have imprecise motion.

24   Q.   Are you aware of anyone ever attempting to

25   change calibration values of an Xi instrument?   14:29

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1   Q.   Is the parent -- when you say the parent

2   company is Microchip, is that because Microchip is

3   the parent company of Atmel?

4   A.   That is correct.

5   Q.   And the Xi devices use an Atmel RFID chip? 14:45

6   A.   That is correct.

7   Q.   Does CryptoRF appear to be referring to

8   the cryptography used to protect data in the Atmel

9   RFID chip used in Xi instruments?

10   MS. CAHOY: Objection to form.   14:46

11   THE WITNESS: I am not the subject matter

12   expert, Josh, on that.

13   BY MR. VAN HOVEN:

14   Q.   It's your understanding that Xi -- that

15   the Atmel chip used in Xi instruments has   14:46

16   cryptography, right?

17   MS. CAHOY: Objection to form.

18   THE WITNESS: Does it have -- so, okay,

19   let me clarify.   It has encryption, if -- if

20   that's what you mean by "cryptography."   14:46

21   Yes, it does have encryption.

22   Cryptography is the field, I would think.

23   BY MR. VAN HOVEN:

24   Q.   Got it.

25   And cryptography is kind of an overarching 14:46

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 1     field?

 2          A.   Correct.

 3          Q.   Encryption is a particular manner in which

 4     data is protected on the --

 5          A.   That is --                                    14:47

 6          Q.   -- chip?

 7          A.   That is correct.

 8          Q.   And do you have an understanding of -- of

 9     what it would mean for the "CryptoRF product line

10     we currently use is not as secure"?                     14:47

11          A.   I do not.

12          Q.   Do you think it might mean that the

13     encryption is not secure from hacking?

14               MS. CAHOY:  Objection to form.

15               THE WITNESS:  Again, not the subject          14:47

16     matter that I worried about.

17     BY MR. VAN HOVEN:

18          Q.   But do you see the next sentence in the

19     e-mail chain that you are copied on, starting with

20     "Not sure..."?                                          14:47

21          A.   "Not sure...," correct.

22               I read that, yes.

23          Q.   Do you see it states that the Microchip

24     employee "seemed to be suggesting that there may

25     be opportunity to hack the chip we use"?                14:48
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1   REPORTER CERTIFICATE

2

3   I, KIMBERLY L. AVERY, do hereby certify:

4   That SHARATHCHANDRA "SHARK" SOMAYAJI, in the

5   foregoing deposition named, was present and by me sworn

6   as a witness in the above-entitled action at the time

7   therein specified;

8   That said deposition was taken before me at said

9   time, and was taken down in shorthand by me, a

10   Certified Shorthand Reporter of the State of

11   California, and was thereafter transcribed into

12   typewriting, and that the foregoing transcript

13   constitutes a full, true and correct report of said

14   deposition and of the proceedings that took place;

15   That before completion of the proceedings, review

16   of the transcript was requested.

17   IN WITNESS WHEREOF, I have hereunder subscribed my

18   hand this 16th of November 2022.

19

20

21

22

23   _____

         KIMBERLY L. AVERY, CSR No. 5074

24   State of California

25